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The North American Species of *Agrimonia*.

BY EUGENE P. BICKNELL.

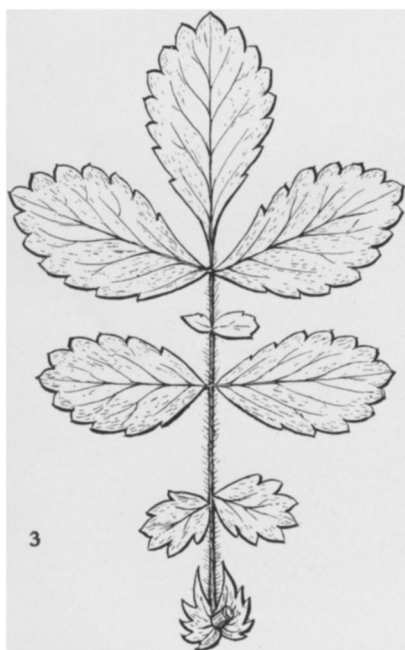
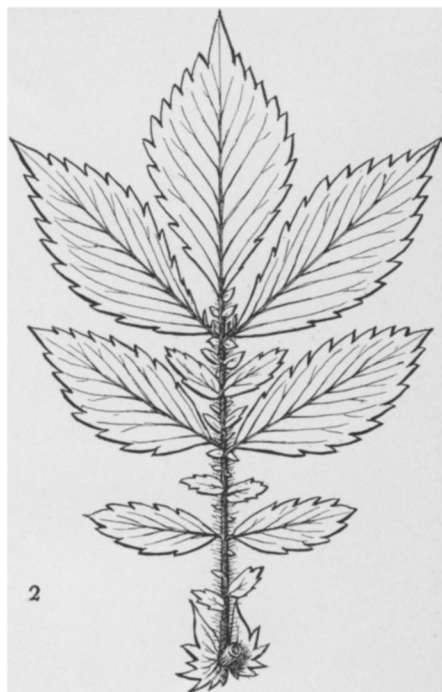
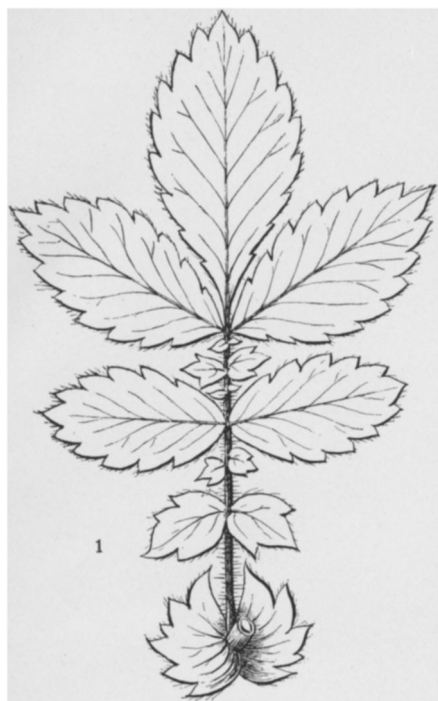
(PLATES 282, 283.)

Perhaps no one of our long-known plants has more effectually escaped a right understanding by botanists than the familiar Agrimony of the Eastern States, long current in local floras and text-books as *Agrimonia Eupatoria* L. This name, it seems, has been doing duty since the beginning of American botany for a considerable *group* of related species, of which at least five may now be clearly recognized. Nor is this all; for, as first shown by Dr. Britton (Bull. Torr. Club, 18: 366, 1891), the true *Agrimonia Eupatoria* is not known at all as an American plant and is very distinct from that particular one of our native species which has been more especially referred to it.

For the initial fault in this misunderstanding we must go back to "Species Plantarum," wherein, under *A. Eupatoria*, we find the citation "Gron. Virg.," although the inconsistency follows that the species is attributed to Europe only. Walter seems to have been the first of our writers to adopt the name definitively into the American flora (Fl. Car. 1788), though it is not now possible to determine the exact sense in which he used it. And so with most subsequent authors the name as used has doubtless a composite significance, though mainly intended to designate our most common and generally distributed species.

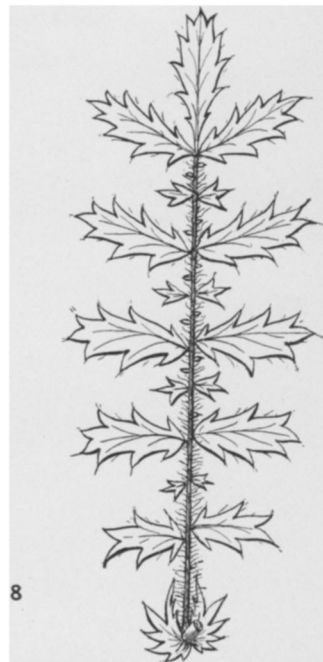
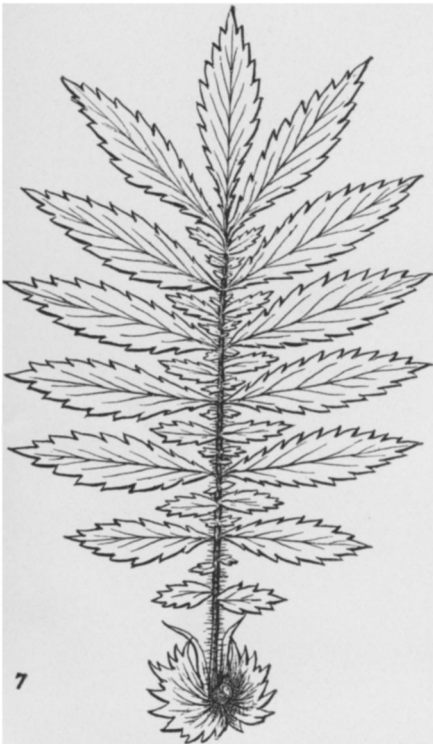
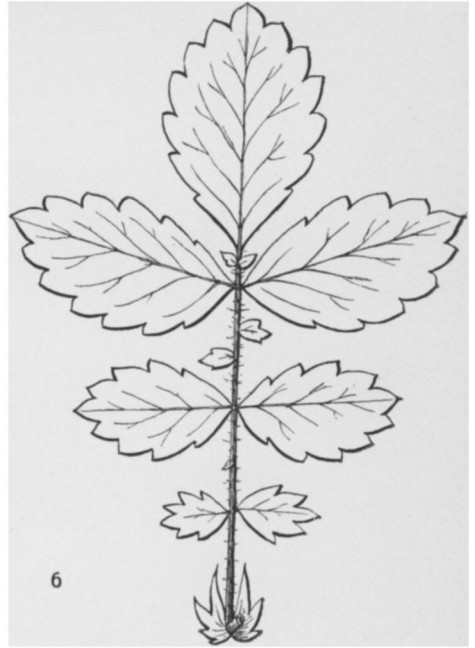
Muhlenberg appears to have been the first to perceive that this plant was not identical with the European and he gave it its first distinctive appellation—*hirsuta* (Cat. 47, 1813). Muhlenberg, indeed, seems to have better understood our group of species than any subsequent writer except Wallroth, although he has been quite overlooked, and his name *hirsuta*, for our representative species, which it now becomes necessary to adopt, was afterwards independently used by Torrey for a more hairy form of the same plant.

The genus *Agrimonia*, with especial reference to the North American species, may be characterized as follows:



1. *AGRIMONIA HIRSUTA* MUHL.
3. *AGRIMONIA MOLLIS* (T. & G.) BRITTON.

2. *AGRIMONIA BRITTONIANA* BICKNELL.
4. *AGRIMONIA MOLLIS* VAR.



5. *AGRIMONIA PUMILA* MUHL.

7. *AGRIMONIA PARVIFLORA* SOLAND.

6. *AGRIMONIA STRIATA* MICHX.

8. *AGRIMONIA INCISA* T. & G.

AGRIMONIA L. Sp. Pl. 448. 1753.

Perennial, erect or assurgent, mostly glandulose herbs, simple or branched above, with alternate, conspicuously stipulate, odd-pinnate leaves bearing interposed subleaflets, and small regular perfect yellow flowers in spicate racemes. Flowers short-pedicelled or subsessile, axillary from small 3-cleft bracts and with a pair of trifold or entire bracteoles at the base of the calyx. Calyx-tube in fruit obconic, turbinate or hemispheric, short-stipitate, sulcate, uncinately-spinose or bristly above, contracted at the throat to form a flattened or convex disk which supports a central process formed by the five connivent calyx-lobes. Petals 5, inserted with the 3-15 stamens in the margin of a waxy disk which surrounds the terminal styles in the throat of the calyx; anther-cells mostly separated by a broad connective. Carpels 2, included, developing into one or sometimes two one-seeded achenes with membranous testae contained in the indurated calyx tube, seeds suspended.

Leaflets crenate, dentate, serrate or incised, the teeth mucronulate or having a minute callosity in the tip. Lower stipules smaller and simpler than those above. Stamens variable in number in the same species, often fewer than normally in the terminal or later flowers. Roots either fibrous or tuberous-thickened.

The North American species, as far as known, are as follows. The ranges given are based alone on specimens actually examined, and are doubtless subject to considerable extension in some cases.

1. AGRIMONIA HIRSUTA (Muhl.).

A. Eupatoria of most American authors, not L.

A. eupatoria hirsuta Muhl. Cat. ed 1, 47. 1813.

A. Eupatoria β *hirsuta* Torr. Fl. 473. 1824.

A. gryposepala Wallr. Beitr. 1: 49. 1842.

New Brunswick to Minnesota and Nebraska, south to North Carolina; California.

2. AGRIMONIA STRIATA Michx.

A. striata Michx. Fl. Bor. Am. 1: 287. 1803 (*fide* T. & G.).

A. eupatoria β *glabra* Muhl. Cat. ed. 1, 47. 1813.

A. parviflora DC. Prodr. 2: 587, excl. Aiton. Not Soland. 1821.

A. Eupatoria δ *parviflora* Hook. Fl. Bor. Am. 1: 197. 1830.

A. microcarpa Wallr. Beitr. 1: 39. 1842.

A. rostellata Wallr. Beitr. 1: 42. 1842. = "*A. americana* Luca in herb." Wallr. loc. cit. as syn.

Southeastern New York, and doubtless Connecticut, to Virginia, west to Missouri.

3. AGRIMONIA PUMILA Muhl.

A. pumila Muhl. Cat. ed. 1, 47. 1813.

Pennsylvania and Maryland to Florida, west to Kentucky and Louisiana.

4. AGRIMONIA MOLLIS (T. & G.) Britton.

A. Eupatoria γ *mollis* T. & G. Fl. 1: 431. 1840.

A. platycarpa Wallr. Beitr. 1: 38. 1842. = "*A. Eupatoria americana* Beyrich in Herb." *fide* Wallr. loc. cit.

A. pubescens Wallr. Beitr. 1: 45. 1842. = "*A. parviflora* Kinn in Herb." *fide* Wallr. loc. cit.

A. mollis Britton, Bull. Torr. Club, 19: 221. 1892.

Southeastern New York, and doubtless Connecticut, to Michigan, south to Georgia, Tennessee and Kansas.

5. AGRIMONIA BRITTONIANA n. sp.

New Brunswick and Quebec to western New York and doubtless further north and west, south to Ulster and Westchester counties, N. Y., and along the Alleghenies to West Virginia; Montana; Laramie Peak, Wyoming and, either this or an allied form, in Arizona and New Mexico.

6. AGRIMONIA PARVIFLORA Soland.

A. parviflora Soland. in Ait. Hort. Kew. 2: 130. 1789.

A. Eupatoria Michx. Fl. Bor. Am. 1: 287. 1803, chiefly, *fide* T. & G. Not L.

A. suaveolens Pursh, Fl. 1: 335. 1814.

A. serrifolia Wallr. Beitr. 1: 40. 1842. = "*A. Eupatoria americana* Kinn in herb." *fide* Wallr. loc. cit.

Southeastern New York, and doubtless Connecticut, to Illinois and Missouri, south to Georgia and Mississippi.

7. AGRIMONIA INCISA T. & G.

A. incisa T. & G., Fl. 1: 431. 1840.

Florida, Alabama, Georgia, South and North Carolina.

Key to the North American Species of Agrimonia.

Leaflets serrate, dentate or crenate with numerous teeth.

Racemes and leaves beneath glabrous or with loose spreading hairs.

Roots not tuberous; fruit large, turbinate, with numerous radiating bristles.

1. *A. hirsuta*.

Roots tuberous-thickened; fruit very small, hemispheric, with few ascending or erect bristles.

2. *A. striata*.

Racemes and lower surface of the leaves closely or softly pubescent.

Roots tuberous; stems pubescent; leaflets not glandular-dotted beneath.

Small or simple, with elongated terminal raceme, leaflets 3-5.

3. *A. pumila*.

Larger, branched, leaflets 5-11.

4. *A. mollis*.

Roots not tuberous; stems hirsute; leaflets glandular-dotted beneath.

Leaflets 5-9, oblong or rhomboid; fruit large, the bristles connivent,

5. *A. Brittoniana*.

Leaflets 9-23, lanceolate; fruit small, the bristles radiate.

6. *A. parviflora*.

Leaflets incised with few salient teeth.

7. *A. incisa*.

1. AGRIMONIA HIRSUTA (Muhl.).

Commonly 3°-4° tall (2°-6°), simple, to loosely wide branched above, minutely glandulose and somewhat viscid on the branches, aromatic. Stem usually zig-zag from leaf to leaf, villous-hirsute with slender spreading hairs. Leaves bright green, large, 4'-12' long, 3'-8' wide, the villous leaf-stalks usually with short petiolar portion. Leaflets large, rather thin, commonly three pairs (2-4 pairs), elliptic, broadly oblong or obovate-oblong, acute, sessile or subsessile, often with rounded or subcordate base, the odd leaflet short-stalked or subsessile with narrowed base, coarsely serrate with acute or somewhat rounded mucronulate teeth, the margins ciliate-fringed, upper surface glabrous or with short, scattered, appressed hairs, lower surface minutely, often sparsely, pulverulent-glandulose and with scattered hairs on the larger nerves, rarely subpubescent. A frequent size of the leaflets is about $2\frac{1}{2}' \times 1\frac{1}{4}'$, an extreme size $5' \times 3'$. Interposed leaflets normally three pairs in the distal interspace, fewer or smaller in the lower interspaces, the middle pair much the largest, ovate or obovate from a broad base, acutely lobed, often subopposite, in weak plants sometimes much reduced, rarely to a small entire pair. Stipules normally very large, sometimes over an inch broad, the pairs cordate-amplexicaule, often overlapping around the stem, openly cut-serrate or dentate-lobed in the rounded outer margin which is abruptly contracted into the ovate-acuminate incurved terminal lobe. In reduced plants the stipules are smaller and narrower, the lowermost sometimes entire. Branches openly compound, widely spreading or loosely ascending, bearing spreading racemes. Racemes commonly under a foot in length (4'-16'), often inclined in fruit, minutely pulverulent-glandular and thinly spreading-villose, somewhat closely many-flowered or the lower flowers distant on slender ascending pedicels 2"-5" long, the uppermost sometimes subverticillate clustered. Bracts relatively large, the narrow lobes ciliate-fringed, often exceeding the flowers at anthesis; bracteoles lanceolate-attenuate, nar-

rowly 3-cleft or entire. Flowers 4''-6'' broad, bright yellow; anther-cells separated by a distinct connective; flower buds ovoid, narrowed to a prominent point, minutely glandulose. Mature fruit reflexed, large, 3''-6'' long over all and as wide across the bristles, short-turbinate, mostly contracted abruptly to the stipitate base, strongly fluted, pulverulent-glandulose, often slightly strigose at the extreme base; bristles numerous, spinose, loosely covering the convex disk, the lowermost reflexed from the prominently expanded margin of the disk, those above spreading and erect, the innermost slightly exceeding the acute beak-like calycular process and at least half the length of the fruit. The mature calyx-lobes taper into rigid, minutely hooked points which are finally incurved together, a feature which Walroth recognized by his name *gryposepala*. The roots are fibrous, often slightly thickened throughout their length, but never tuberous. They are not fragrant as those of the European *A. Eupatoria* are said to be. (Plate 282, fig. 1.)

Borders of woods and thickets in sun or half shade, growing in vigorous groups or sometimes scattered.

Begins to flower at New York in the first week of July, two or three weeks in advance of any other species, and ceases to flower in August, also earlier than any of its congeners. The date of first flowering has ranged in nine years from June 29 to July 10.

The young herbage, when crushed, exhales an agreeable fragrance which sometimes even suggests that of the Japanese Honey-suckle.

It may be noted that the name *hirsuta* of Muhlenberg now adopted for this plant displaces *hirsuta* of Bongard for a Brazilian species.

2. AGRIMONIA STRIATA Michx.

Slender, commonly $1\frac{1}{2}^{\circ}$ - $2\frac{1}{2}^{\circ}$ high ($8'$ - 5° , simple to delicately paniculate-branched, minutely glandulose nearly throughout, viscid above and in the racemes, agreeably aromatic. Stem glabrous or with scattered spreading hairs (sometimes thinly hirsute at the base, and rarely finely subpubescent above), the slender leafstalks thinly hairy-pubescent to glabrate, scabrous on the lower side. Leaves rarely reaching nearly the extreme size of those of *A. hirsuta*, but usually much smaller. Leaflets sessile or subpetiolulate or the odd leaflet on a slender, sometimes foliolate stalk, commonly two pairs (1-4 pairs, the larger number occurring only rarely and on the lowest leaves), thin, glabrous or nearly so

above, below sprinkled with pellucid glandules and sparingly hispidulous on the larger nerves, the margins subciliate. The leaflets are somewhat variable in form, but are commonly blunter and more obovate-cuneate than those of *hirsuta*, with broader, less acute teeth, the marginal pattern mostly coarsely crenate-dentate to boldly crenate; sometimes they are throughout narrowly obovate-oblong with broad, shallow, semicrenate teeth; on the reduced often trifoliate upper leaves they may be very narrow and sharply dentate-serrate. Interposed leaflets elliptic to obovate, acute, often confined to the distal interspace, usually a small or minute entire pair, occasionally larger and dentate-lobed, rarely with a minute pair on either side. Stipules smaller and narrower than in *hirsuta*, rarely becoming $\frac{1}{2}$ ' wide, often very small, lanceolate to semi-cordate, cut-serrate to deeply incised, the lowest often entire. Inflorescence varying from a short terminal raceme to a delicately branched nearly naked loose panicle, the glandulose racemes only 3'-6' long and rather loosely flowered. Flowers very small, 2"-3" wide, pale yellow, on slightly spreading pedicels 1" or less long; anther-cells contiguous. Bracts minute, ciliolate; bracteoles ovate, 3-lobed or entire. Flower-buds subglobose, almost truncate, the sepals ovate-oblong, obtuse, downy-canescens within the apical margins. Mature fruit subspreading or nodding, very small, 1"-1 $\frac{1}{2}$ " wide, the body subhemispheric, 1" long below the marginless rim, pellucid-glandulose, bristles few and weak, short, erect and slightly spreading, equalled or exceeded by the truncate calycular process which caps the very tumid disk; sulcae rather broad and shallow, converging into the narrow and curved stipe-like base. Roots developing tuberous thickenings which reach a size of 3' \times 2"; elongated roots sometimes show two or three successive swellings. (Plate 283, fig. 6.)

Hilly woodland, mostly in light rich soil; of scattered growth, or forming loose colonies, but never massed in close groups.

Begins to flower at New York from about the middle to the end of July and continues to bloom into early September.

This species need be compared only with *A. hirsuta* which, in its stouter forms, it sometimes closely resembles. It differs most obviously in its tuberous roots, lesser size and more slender habit, nearly glabrous stem and branches, delicate short racemes, smaller flowers with obtuse sepals, much smaller hemispheric fruit with unmarginated disk and few mostly erect bristles, smaller narrower stipules and more crenate leaves. The leaves, generally fewer than in *A. hirsuta*, are more obovate in general outline, the more slender leafstalk rougher below and more narrowly and deeply grooved along the upper side, the leaflets mostly more obversely broadened

and rounded at the apex, the pairs separated by wider intervals, the lowest pair relatively much smaller, the interposed leaflets much less developed, the petiolar portion of the leafstalk longer. In its earlier stages the inflorescence is strikingly different from that of *hirsuta*. In the latter the longer and stouter villous racemes are closely flowered and conspicuously bracteose; in *striata* the delicately slender nearly glabrous racemes are more viscid-glandular and much less closely flowered, with minute inconspicuous bracts and rounded-truncate instead of pointed flower buds.

In adopting the name *striata* for this species I have simply followed Dr. Gray who, having seen Michaux's material, cites the name as a synonym, not of *A. Eupatoria*, but of *A. Eupatoria* var. *parviflora* of Hooker, the plant here taken up, giving to the reference his mark of authentication. (T. & G. Fl. loc. cit.).

3. AGRIMONIA PUMILA Muhl.

The smallest of our species, 1°–2° high, erect or more slender and assurgent, simple or with a few ascending branches from the lower part of the elongated terminal raceme. Stem clothed with loose often coarse pubescence and hirsute with spreading hairs which become subappressed above and obsolete in the pubescent racemes. Leaves often crowded low on the stem, often trifoliate, small, 1½'–3½' long, 1½'–2½' wide, the upper ones much reduced. Leaflets firm, 1–2 pairs, the lower pair always small, oval to obovate or the odd leaflet cuneate, sessile or subpetiolulate, obtuse or rounded at the apex or sometimes acute, crenate or dentate or sometimes boldly crenate-dentate, commonly 1'–1½' long, dark-green above and loosely appressed-hairy to nearly smooth, the margins loosely appressed-ciliate, paler and softly pubescent below, pilose-pubescent or hairy along the veins, obscurely, if at all glandulose; leafstalk villous; subleaflets wanting or a minute pair, entire or few-dentate. Stipules small, the main pairs rounded and cordate-clasping, acutely dentate-lobed or incised, sometimes dentate on the inner margin. Racemes loosely-flowered, often remotely-flowered below. Flowers small, the buds subglobose. Fruit small, 2" long, 1"–1½" wide, turbinate or subhemispheric, minutely glandulose, often canescent in the sinuses when young, the disk mostly obscurely margined and rising to the short and broad calycular process, the bristles loosely ascending and erect. Roots developing short tuberous thickenings. (Plate 283, fig. 5.)

This species is nearly related to *A. mollis* and occasional depauperate plants of the latter are with difficulty distinguishable

from it. I think there can be no doubt, however, that the two species are distinct and that a comparative study of growing plants would disclose more pronounced differences than dried specimens have revealed. The uniformly small size and simple or nearly simple habit of *pumila* and its slender and elongated loosely-flowered raceme are usually sufficient to distinguish it. The pubescence seems to be generally coarser and more hirsute than in *mollis*, and the much smaller, mostly trifoliate leaves more crowded on the lower part of the stem and apparently of thicker texture. I have not seen satisfactory material in mature fruit. The range of the plant is clearly more restricted northward than that of *mollis*, and more extended southward as far as at present known.

I adopt Muhlenberg's name *pumila* for this species with some hesitation and only to avoid the alternative of conferring a new name. Muhlenberg characterized his plant by the one word "little" and gave its habitat as Mississippi. Applying the rule of exclusion it would appear that only this species could have been intended. If it should be found that *A. mollis* extends into Mississippi the name would have only a dubious claim to availability.

4. AGRIMONIA MOLLIS (T. & G.) Britton.

Not aromatic and obscurely if at all glandulose, mostly slender and 2°-3° high (1° to over 6°), the branches ascending or sometimes spreading, either few and simple or forming a loose panicle which exceptionally attains a spread of as much as 2°-3°. Stem below loosely tomentose-pubescent and weakly villose with spreading or subspreading hairs, becoming finely hoary-tomentose or subappressed pubescent above and in the racemes. Leaves rather dark green, 3'-12' long, 2'-7' wide, a common size being 5' or 6' by 3' or 4'. Leaflets commonly 2 or 3 loosely separated pairs (1-4 pairs), mostly obovate-oblong, varying from obovate to elliptic, subsessile, rounded or somewhat acute at apex, dentate-serrate to crenate, the odd leaflet mostly obovate, often on a foliolate stalk, reaching an extreme size of $4\frac{1}{2}' \times 2'$, the largest lateral leaflets becoming $3' \times 1\frac{1}{2}'$; upper surface sparsely hirtellous-pubescent and roughish to glabrate, the margins finely subappressed-ciliate, lower surface paler and minutely downy to velvety-pubescent; leafstalk finely pubescent and somewhat tomentose-villose. Stipules varying from small, lanceolate and entire on the lower leaves and in dwarf plants to cordate-clasping with cut-serrate or incised

outer margin, on stout plants sometimes 2' long by 1' wide. Interposed leaflets often only a small entire pair in the distal interspace, sometimes larger, obovate-oblong and dentate above with a single minute one or a pair on either side. Racemes slender, mostly 5'-10' long, rarely 16', rather loosely flowered. Flower-buds rounded, scarcely or not at all glandulose. Flowers 3"-5" broad, rather deep yellow; anthers with broad connective. Bracts and bracteoles pilose-ciliate, very small, at least the bracts narrowly 3-cleft. Fruit before maturity oblong and ascending, later reflexed or subspreading on short appressed pedicels, minutely subglandulose and slightly strigose, small, 2"-2½" long, 1½"-2" wide, narrowly turbinate to subhemispheric, often with a somewhat narrowed nonsulcate basal portion, or the lowest fruit of the racemes sometimes depressed-turbinate, marginless or obscurely margined, the disk flat or slightly convex with obtuse sepaline process, bristles loosely ascending or closer and nearly erect, equalling the body of the fruit or only half its length. Roots tuberous-thickened as in *A. striata*, but the swellings often thicker and less tapering at either end, often club-shaped. (Plate 282, fig. 3.)

Dry open woods and copses and weedy banks and hillsides. Of scattered or solitary habit of growth.

Begins to flower at New York from the middle to the end of July and blooms later than any other species; belated flowers are sometimes to be found at the middle of October.

Reduced plants are sometimes trifoliate nearly throughout and simulate *A. pumila*. It will be usually evident to the collector of such forms, however, that they represent a state of imperfect development under unfavorable conditions of growth.

This is the most variable of our species and runs into several unstable forms. It should not be overlooked, however, that it shows a well-defined tendency to separate into two particular forms or varieties. Extreme examples of both are common and exhibit so considerable a degree of divergence that the eye always gives them instant recognition. Although both varieties are to be found holding their characters perfectly under identical conditions of soil and situation, intermediate forms, or what appear so to be, are of such frequent occurrence that I have not been able to satisfy myself of the expediency of giving a distinctive varietal name. For the sake of definiteness, however, the foregoing description of *A. mollis* has been made to cover only the form represented by the type, a specimen of which is preserved in the Herbarium of

Columbia University ("Red River, Dr. Pitcher"), excluding its variety, which may be separately characterized as follows:

Pubescence throughout denser and more pilose than in the type, the smaller and narrower leaves dull grayish green, the leaflets much narrower and dentate rather than crenate, the pairs closer and often more numerous. The hairs of the stem are longer and weaker than in the type and often loosely appressed, the pubescence above tending to become dense and pilose-canescenscent. The leaflets are mostly 4 pairs, though often 5-6 pairs on the narrowed lower leaves, narrowly-oblong (linear- or lanceolate-oblong) to elliptic, often inequilateral and backwardly subfalcate, blunt or subacute, abruptly narrowed or rounded at the sessile base, mostly dentate or dentate-serrate, often with broad, shallow, uneven teeth, the odd one mostly sessile, or when petiolulate frequently cleft basally into a pair of narrow decurrent lobes, above finely pubescent to softly appressed pilose, whitened below and softly appressed pubescent, the veins pilose, subleaflets narrower than in the type, often borne well forward in the interspace. Stipules irregularly cut-serrate or dentate-lobed, usually less incised than in the type with shorter termination, the upper ones often dentate-serrate on the inner margin and more spreading. Fruit often with more convex disk and longer more spreading bristles, usually also with a perceptible rim. Apparently the tuberous thickenings of the roots tend to become stouter than in type and to develop on shorter roots; the largest found were $3\frac{1}{2}'$ long by $3\frac{1}{2}''$ thick. (Plate 282, fig. 4.)

The specimens that have come under my observation would appear to indicate that this form was of more coastwise range than the type extending from southern New York to Virginia Beach and to middle North Carolina and East Tennessee.

5. *AGRIMONIA BRITTONIANA* n. sp.

Becoming stout and tall and strongly virgate-branched, 2° - 7° high (6° 9' at York Harbor, Maine), the stems sometimes $4''$ - $5''$ thick at the base, erect, but often leaning under the weight of the heavy fruiting racemes, somewhat aromatic. Stem roughened with glandular papillae and hirsute with short spreading brownish hair which passes into a downy or pilose-hairy pubescence in the racemes. Leaves numerous, often ascending or subappressed, $4'$ - $8'$ long, $2'$ - $4'$ wide, the villous pubescent leafstalks downy-tomentose on the upper side. Leaflets 3-4 pairs or 5-6 pairs on the narrower and longer-petioled lower leaves, often directed sharply forward, strongly veined, becoming thickish and rugose, dark green above and more or less hispidulous or scabrous, at least near the edges, the margins finely ciliate, below paler and pubescent (soft-

pubescent to nearly glabrous) with longer usually subappressed brownish hairs on the nerves and freely sprinkled with minute glistening glandules, in shape lanceolate to elliptic or ovate-elliptic, tapering from near the middle to either end, often decidedly tetragonal or rhomboid, acuminate or very acute, sharply serrate with mucronulate often deeply cut teeth (rarely with broader even subcrenate teeth), the narrowed base and acuminate apex often entire, usually petiolulate or the distal pair sessile and decurrent, the odd leaflet sessile or on a foliolate stalk and frequently pinnatifid at the base, the lateral leaflets more rarely basally pinnatifid, but never on the lower side in the distal pair. A common size of the leaflets is $2' \times \frac{3}{4}'$, and extreme size $3\frac{1}{2}' \times 1\frac{1}{2}'$ (on the lower leaves the leaflets are often shorter and less pointed with more deeply cut narrower teeth). Interposed leaflets 2-7 pairs, frequently subopposite, narrow, often linear-oblong, the main pair dentate-serrate above the middle, the others much smaller or minute, entire; not seldom a minute pair subtends a pair of leaflets like a set of stipels. Stipules lanceolate to half ovate, lacinate or cut-lobed, the terminal lobe broader and acuminate sometimes with one or two teeth on the inner margin. Main racemes 12'-18' long, obscurely pulverulent beneath the pubescence, densely flowered except near the base, some of the flowers often subverticillate-clustered, rarely loosely flowered, erect or ascending, at maturity often declined from the weight of the abundant fruit. Flower-buds mammillate; flowers 3"-5" wide, shorter-pedicelled than in *hirsuta*, the petals more rounded, mostly thicker and deeper yellow; anthers smaller with narrower connective; bracts smaller and less ciliate; bracteoles ovate, short-acuminate, entire or slightly lobed. Mature fruit closely reflexed against the pedicel and stem, large, 2"-3" broad, 3"-4" long, rather long-turbinate, the walls thickened and much indurated, strongly fluted between the deep furrows, minutely puberulent-granular and with traces of appressed hairs, the furrows strigose-canescens; disk becoming flat or concave, marginless; bristles numerous, short, one-quarter to one-third the length of the fruit, at first ascending and erect, finally connivent in a conical mass over the concealed calycular process. Sepals less acuminate than in *hirsuta* and more canescent within the tip, the apex at maturity scarcely hooked. The tips of the bracts, sepals and bristles with the callosities tipping the teeth of the leaves early become tinged with reddish-purple. Rootstock much as in *hirsuta*, but even stouter, the long roots as in that species slightly thickened throughout and not tubiferous. (Plate 282, fig. 2.)

Roadsides and borders of woods, flowering from the end of June to late in August. Usually forming close colonies or compact groups.

SPECIMENS EXAMINED:

- Maine, St. Francis, St. John's River, Aug. 10, 1893. M. L. Fernald.
 Canada, Notre Dame du Lac, Temiscouata Co. Aug. 6, 1887. John L. Northrop.
 New York, near Elizabethtown, Essex Co. Sept. 5, 1892. N. L. Britton
 " Tannersville, Green Co. Aug. 7, 1891. Miss Anna Murray Vail.
 " White Plains, Westchester Co. Miss Phoebe McCabe.
 Massachusetts, Lenox. July 11, 1889. W. M. Whitfield.
 Pennsylvania, Lycoming Co. September 18, 1890. John K. Small and A. A. Heller.
 West Virginia, Lone Tree Knob, Summit. C. F. Millspaugh, M. D. Flora of West Virginia, No. 450.
 Montana, Belt Mountains, near Hound Creek. Aug. 2, 1883. F. Lamson Scribner.
 Wyoming, Laramie Peak. Aug. 8, 1895. Aven Nelson. Flora of Wyoming, No. 1653.

I have also received the plant from Lewis and Ulster Counties, N. Y., and have collected it at York Harbor, Maine, the type locality, and in the Pocono region of Pennsylvania.

Type specimens from York Harbor are deposited in the Herbaria of Columbia University, and the New York Botanical Garden.

I take pleasure in naming this species in honor of Dr. N. L. Britton.

To anyone not having given particular attention to our species of *Agrimonia* it is altogether likely that this plant would pass unquestioned for *A. hirsuta*. It has more the general aspect of that species than of any other, the large fruit distinguishing it at once from *A. mollis*, with which in some respects it appears to have closer affinity. From *hirsuta* it may be readily distinguished by reference alone to its hoary pubescent racemes and darker green acuminate leaflets pubescent on the lower surface. It is less glandulose and aromatic than *hirsuta* and grows to be stouter and taller with straighter stem, stouter more ascending branches and longer more virgate racemes. The hairiness of the stem is also of a different character, being coarser and denser, with shorter, stiffer hair. The leaves are commonly narrower and less spreading, the thicker rugose-veiny leaflets more sharply serrate and acuminate with pubescent lower surface bearing brighter glandules and having the margins ciliolate instead of ciliate-fringed. Numerous specimens of *hirsuta* have failed to show any indica-

tions of incised bases of the lateral leaflets or a decurrent distal pair, or subleaflets in the position of stipels. The stipules of *A. Brittoniana* are narrower and more incised than those of *hirsuta*, and the bracteoles are notably unlike. The fruit, which is more crowded and closely reflexed, is of a different form, wanting the expanded marginal rim, tumid disk and contracted base characteristic of the fruit of *hirsuta* and, at maturity, presenting a signally diverse appearance from all our species by reason of the conical mass of connivent bristles.

From *A. mollis* the species differs in greater size, the stouter stem harshly hirsute instead of loosely villose or tomentose-pubescent, larger and thicker acuminate leaves provided with shining glandules on the lower surface and quite wanting the obovate or oblong figure and crenate or dentate margins of those of *mollis*, larger, more crowded flowers, much larger, more turbinate and deeply sulcate fruit having the bristles crowded and connivent instead of loosely ascending or erect.

The general character of the pubescence and branching of *A. Brittoniana* is much like that of *A. parviflora*, and the glandules beneath the leaflets present nearly the same appearance in both species. Other, if slighter, evidences of relationship between the two plants may also be noted, such as the sharply serrate often narrow leaflets of *Brittoniana*, the occasionally decurrent distal pair, the narrow and numerous subleaflets, the elongated racemes. These characteristics are more or less distinctive of *Brittoniana* among our species other than *parviflora*, in which they all find a more pronounced expression. The fruit of the two species is, however, remarkably different.

A. Brittoniana is in fact very distinct from any American species while nearly related to certain Asiatic forms—*A. viscidula* Bge., *A. pilosa* Ledeb. and *A. Dahurica* Willd., plants which have been variously confused together by authors, and all of which have finally been referred to *A. Eupatoria* L.

6. AGRIMONIA PARVIFLORA Soland.

Aromatic and glandulose, commonly $3\frac{1}{2}^{\circ}$ – $4\frac{1}{2}^{\circ}$ tall ($1\frac{1}{2}^{\circ}$ to over 6°) virgate-branched above, the ascending branches simple or loosely few-branched and forming elongated strict racemes. Stem stout, becoming 4''–6'' thick below, papillose-roughened and

densely hirsute with spreading brownish hair which conceals a fine surface pubescence and passes into a close hoary pubescence in the racemes; in immature plants the hairiness is very dense and sub-appressed, the young branches and racemes densely canescent-pilose. Leaves bright green, numerous, mostly spreading, but often the lower leaves are deflexed, those above spreading, the upper ones rapidly diminished in size and ascending or erect, mostly oblong to narrowly-oblong in general outline, 4'-12' long, 2'-7½' wide; leaflets commonly 11-17, or sometimes as many as twenty-three on the narrowed lowermost leaves, strongly-nerved and rugose, minutely petiolulate or sessile, spreading, the distal pair obliquely contiguous to the odd one and often decurrent on the leafstalk, the lower pairs frequently somewhat alternate, lanceolate, sometimes narrowly lanceolate, tapering to either end, acutely serrate, 1'-4¼' long, 4"-14" wide, a common size being 2½' × 8"-9", above obscurely hispidulous to glabrous, usually finely scabrous near the edges, the margins minutely ciliolate, paler below and thinly to softly pubescent, with longer appressed or spreading often brownish hairs on the nerves and sprinkled with minute shining glandules. Leafstalk villous, tomentose-pubescent on the upper side. Interposed leaflets crowded, mostly 4-5 pairs except in the lowest interspaces, often subopposite, mostly narrowly oblong and sessile by a broad base, the main pair sharply serrate to below the middle, separated by only a minute pair from the succeeding pair of leaflets, the others gradually smaller, all but the most minute sharply-toothed. Stipules, except the reduced lower ones, broadly cordate-amplexicaule, sometimes 1' broad, the outer margin serrate or cut-serrate, deeply cleft at the tip into a narrow attenuate lobe sometimes 1' long, which stands either abruptly erect against the stem or is bent sharply backward. Racemes glandulose beneath the pubescence, mostly erect or sharply ascending, 10'-21' long, many-flowered. Flowers 3"-5" broad, rather pale yellow with thin narrow petals; anthers small with broad connective. Bracts very small, pilose-pubescent, the lobes filiform; bracteoles very small, trifold. Flower-buds very small, somewhat obovoid and subtruncate, slightly mamillate, somewhat glandulose, sepals ovate-oblong, acute. Fruit small, nodding on slightly spreading pedicels, 1"-2" wide and long, minutely glandulose; the slender stipe-like base slightly strigose, the body subglobose, short-turbinate or hemispheric below the bristles, the disk much elevated; bristles medial on the fruit, the outer short and reflexed, the innermost erect, equalling or exceeding the broad subtruncate calycular process. Base of the stem bulbous-thickened in the form of an oblong tuber sometimes nearly 1' in diameter. Roots not tuberous-thickened.

Comes into flower from the middle to the end of July, continuing to bloom till about the middle of September.

This species is naturally a plant of low damp grounds and in such situations reaches its fullest development, commonly growing in scattered communities about the borders of weedy thickets. Occasionally it establishes itself in dry soil and becomes much reduced and quite distinct in appearance from the normal plant, though clearly nothing more than a dry ground state of the species. Extreme examples of this form are only $1\frac{1}{2}$ ' tall and simple, terminating in a raceme 6'-8' long; the leaves are much crowded, often reflexed and not larger than 3'-5' long by $2'-2\frac{1}{2}'$ wide; the small leaflets number only 3-5 pairs and are mostly elliptic and finely and sharply serrate, the subleaflets reduced in size and number and obovate, the stipules very small; on small sterile plants, the small leaflets may be oval and rather bluntly serrate and sometimes number only 2-3 pairs. (Plate 283, fig. 7.)

7. AGRIMONIA INCISA T. & G.

From 1° - $3\frac{1}{2}^{\circ}$ tall, either simple, terminating in an elongated strict raceme, or bearing also ascending racemes from bracts or reduced leaves on the upper part of the stem. Stem clothed with a close soft-pubescence and villous with loosely spreading hairs which become subappressed and more pilose above and disappear in the pubescent and glandulose racemes. Leaves numerous, rather close and ascending, becoming gradually smaller and appressed above, narrowly-oblong or oblanceolate in general outline, 3'-6' long, $1\frac{1}{2}'$ -2' wide, the leafstalks tomentose-pubescent and villous. Leaflets thickish, prominently veiny, commonly 4-5 pairs, short, mostly oblong and $\frac{3}{4}'$ in length, 4"-7" wide, sessile, or subpetiolulate, abruptly acute at base, rounded or acute at apex the odd one rather longer and with more narrowed base, acutely incised-serrate with few (3-6 on each side) salient, often slightly recurved teeth penicillate-haired from the apex, upper surface velvety, lower surface soft-pubescent and pilose-hairy, thickly covered with minute shining glands. Subleaflets a small 3-cleft pair in each interspace, with or without a minute entire pair on either side. Stipules narrowly laciniate-lobed, the terminal lobe longer, often cut on the inner side. Flowers rather large, rather loosely disposed on short subappressed pedicels; sepals elliptic; bracts and bracteoles very small. Fruit about 2" long, $1''$ - $1\frac{1}{2}''$ wide, short-obovate or obconic with rather broad furrows, the numerous crowded bristles mostly marginal, ascending and erect, exceeding the broad obtuse calycular process. Roots not seen. (Plate 283, fig. 8.)

Dry pine woods, according to the label on one specimen.

Explanation of Plates 282 and 283.

- Fig. 1. *Agrimonia hirsuta* (Muhl.).
 " 2. " *Brittoniana* n. sp.
 " 3. " *mollis* (T. & G.) Britton.
 " 4. " *mollis* var.
 " 5. " *pumila* Muhl.
 " 6. " *striata* Michx.
 " 7. " *parviflora* Soland.
 " 8. " *incisa* T. & G.

***Geum Canadense flavum* (Porter) Britton, a valid species.**

BY EUGENE P. BICKNELL.

This plant is clearly an excellent species and should stand as *Geum flavum* (Porter). It is common in the vicinity of New York and shows itself to be perfectly distinct from its near relative, *Geum Canadense* Jacq., with which it is often found associated. Its points of difference from the latter are by no means confined to the size and color of the petals, but involve the pubescence, the form and texture of the leaves the branching of the inflorescence and other less obvious features. As these characters have never been pointed out, it may be useful to draw attention to them.

Geum flavum is much more coarsely pubescent below than *Canadense*, in which the basal petioles and lower part of the stem are often glabrate or only sparsely pubescent; in *flavum* the lower stem is hirsute-pubescent, often equally so with *Geum Virginianum* L., the leafstalks spreading-villose.

The leaves of *flavum* are mostly larger, thinner and duller green than in *Canadense*, often becoming very large and lax. The largest in specimens before me are 8' long by 7' wide on petioles 3' in length, dimensions which greatly exceed anything seen in *Canadense*. The long-petioled basal leaves at flowering time are exceedingly multiform, varying from cordate-orbicular through trifoliate to pinnate with two or three pairs of leaflets, showing a much readier tendency to a pinnate form than those of *Canadense* and to the development of small subleaflets on the petiole. The lower cauline leaves reveal the same tendency to greater subdivision than those of *Canadense*, which are rarely other